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ABSTRACT

A detailed assessment of the average class size in Massachusetts public schools is provided in this report, which includes the means and ranges of average class size and a description of class size across grade levels, subject area, and community type. Data were collected from the Chapter 188 Individual School Report (1987-88), an annual survey of Massachusetts public schools conducted by the State Department of Education. Section 1 provides background information on research related to class size, and section 2 describes statewide class size data by grade level, subject area, and type of community. Implications for policy making are discussed in the third section, and methodology is described in the final section. Seven figures and seven tables are included. (LMI)

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AVERAGE CLASS SIZE IN MASSACHUSETTS' PUBLIC SCHOOLS FOR THE 1987-88 SCHOOL YEAR

October 1990

Prepared by

The Regional Laboratory for Educational Improvement of the Northeast and Islands

Massachusetts Department of Education
Office of Planning, Research and Evaluation

EA 022 677

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Abstract
Average Class Size in Massachusetts' Public Schools
for the 1987-88 School Year

OVERALL RESULTS

Average class size varies across kinds of communities, school districts, and schools, with diversity existing as well between grade levels and subject areas within a school, and between elementary and secondary levels. The average class size across Massachusetts' public schools and kinds of communities are presented in TABLES I and II below. TABLE I indicates that, based on aggregated data, the average class size in Massachusetts is approximately 21. TABLE II represents average class size for elementary and secondary grades across the seven kinds of communities found in Massachusetts.

TABLE I

SCHOOL ORGANIZATION	AVERAGE CLASS SIZE*
Kindergarten	20.9
Grade 1 through Grade 3	21.8
Grade 4 through Grade 6	22.0
Grade 7 through Grade 8	21.7
Grade 9 through Grade 12	19.5

TABLE II

KIND OF COMMUNITY	AVERAGE CLASS SIZE** Elementary Gr. K-6	Secondary Gr. 7-12
Urbanized Centers (KOC1)	22.4	20.8
Economically-Developed Suburbs (KOC2)	21.5	19.9
Growth Communities (KOC3)	22.7	20.9
Residential Suburbs (KOC4)	21.1	20.1
Rural Economic Centers (KOC5)	20.4	18.9
Small Rural Communities (KOC6)	16.4	18.5
Resort/Retirement/Artistic (KOC7)	18.4	17.1

*This data is an average of the average class size reported by all districts for each grade level within the grouping.

**Averages at the elementary level represent an average of self-contained classrooms, grades K-6, across reporting districts. At the secondary level, the average is representative of tenth grade Language Arts classes across reporting districts.

The following report provides more detail on average class size of public schools in Massachusetts. Means and ranges of average class size are presented for the schools that reported this information. Data have been disaggregated to describe average class size across grade levels, by subject area, and across kinds of communities. Additional descriptive analyses are included to further detail the variation in each of these categories; no attempt has been made to interpret these data further within the confines of this report.

Summary

This report provides more detail on average class size of public schools in Massachusetts. Means and ranges of average class size are presented. Data have been disaggregated to describe average class size across grade levels, by subject area, and across kind of communities. Additional descriptive analyses are included to further detail the variation in each of these categories.

Report Organization

This report is divided into four sections:

- Section I provides background information on research related to class size.
- Section II describes statewide class size data by grade level, subject area, and kind of community.
- Section III provides a concluding summary.
- Section IV describes the methodology used in this study.

Summary of Findings:

- The average class size for all schools in Massachusetts for the 1987-88 school year was approximately 21. Class sizes in elementary schools averaged 22; while class sizes in secondary schools averaged 20.

- In elementary schools, there was little variation in the average class size by grade level.

- In secondary schools, average class sizes decreased with each successive grade level, from 22.5 at grade seven to 18.2 at grade twelve.

- In secondary schools, class sizes in Language Arts and Social Studies were larger than in science and math. Average class sizes were smallest in the foreign languages.

- At 22.7 and 22.4, growth communities and urban centers, respectively, had the highest average elementary class sizes compared to an average class size of 16.4 for the small rural communities.

- A pattern similar to the elementary level was found at the secondary level, where the average class size of 20.9 for growth communities and 20.8 for urban centers was larger than the average class size of 18.5 for small rural communities and 17.1 for resorts.

SECTION I: INTRODUCTION

Purpose of Report

In response to the growing concerns about public education, Massachusetts in 1987 began a systematic collection, compilation, and analysis of various educational indicators which over time will provide data for informed decision-making at the state and local levels. Reports on high school graduation requirements, grade retention, basic skills testing, drop-out rates, attendance, truancy, and now class size add to a body of data critical to profiling the status of education in Massachusetts. Specifically, these data will function as the baseline for comparison with future data to determine if the budgetary cuts resulting in school closings, decreased teaching staffs, and reduction in curricula offerings, affect average class size within grade levels or subject areas, or across school districts and kinds of communities.

Data provided in this report were submitted by individual public schools for the school year 1987-88 under the authority of *The Massachusetts School Improvement Act of 1985 (Chapter 188)*. The school reform law requires schools to submit information on selected educational indicators to the Department of Education annually.

What Class Size Data Tell Us

The relationship between class size and educational outcomes such as student achievement, teacher satisfaction, and student affect is both a controversial and much investigated subject. One contingent of educators, parents, students, and community contends that the higher operating costs of smaller classes ($n < 15$) are justified by their promotion of increased teacher and student morale and higher student achievement, especially for at-risk and low-achieving students. This contingent is countered with arguments that there is no conclusive evidence indicating that smaller class size maximizes learning or the learning environment, and therefore, does not earn the expense of maintenance.

Differing perspectives within these contingents result from personal preference, experience in educational settings, or from a research base, but, there is agreement on the fact that operating smaller classes does indeed cost more in the short term than operating larger classes. However, long term educational decision-making often requires an assessment related to additional teaching staff.

Class size research includes many well designed and carefully conducted studies which, unfortunately, do not provide definitive conclusions on the optimum class size for enhanced student outcomes because of 1) inconsistencies across studies in definitions of class size, student achievement, or teacher and student affect; 2) inadequate research design and/or poor statistical measures employed; 3) conduct of studies in combinations of elementary and secondary classes; or 4) inability to isolate the class size variable from other variables such as economic factors, student/teacher characteristics, instructional goals or strategies, or grade level groupings.

One of the more extensive syntheses of class size research by Robinson and Wittebols (1986), *CLASS SIZE RESEARCH: A Related Cluster Analysis for Decision Making*, was written to "summarize all of the research pertaining to class size and to present the research findings in ways that will be of the greatest assistance to decision makers in drawing their own informed decisions." A useful resource, this brief reviews the research on class size as it relates to grade levels, subject areas, student achievement and other factors. Presented with caveats to "weigh this analysis carefully and apply it cautiously to specific problems and conditions," both general and specific findings from the research related to the reduction of class size are presented below.

GENERAL FINDINGS RELATED TO REDUCTION IN CLASS SIZE (n < 15):

- Increased student-teacher interaction and contact;
- Increased teacher morale and reduction in teacher stress;
- More individualized attention and instruction;
- Positive influence on student attitudes, attention, interest, and motivation, even more strongly than academic achievement;
- Preferred by parents, teachers and students;
- Little effect on academic achievement without changes in instructional methods;
- Rarely leads to the adoption of dramatically different instructional methods.

SPECIFIC FINDINGS RELATED TO REDUCTIONS IN CLASS SIZE (N < 15):

- Reductions in class size seem to be more effective in early primary grades (K-3) especially in reading and mathematics.
- Reductions in class size appear to be most beneficial for disadvantaged and lower achieving students.
- It is inadvisable to reduce or increase class size with the intent of producing a specific educational outcome.
- It is confirmed that there is an increased cost associated with reduction in class sizes at any grade or subject level. The benefits should be determined to outweigh the cost. It may be more advisable to consider reorganization of group structure within a classroom to small group instruction rather than a revamping of class size.
- Within the context of smaller class size there appears to be a change in teacher behavior and attitude and the use of more varied instructional methods. It may be more cost- and learner- effective to concentrate on these "sub-variables."

SECTION II:
AVERAGE CLASS SIZE DATA
FROM MASSACHUSETTS' PUBLIC SCHOOLS

In order to support informed state and local decision-making on improving education in Massachusetts' public schools, the Department of Education prepares annual reports on selected educational indicators. It is the hope that data on average class size will be used in conjunction with other relevant educational indicators to define changes needed to impact positively on the learner and the learning environment.

Class Size Average Results by Grade Level

The following tables and graphs present information on average class size for reporting schools within the various school organization categories and by kinds of communities.

As indicated on TABLE III and in Figure B the average class size across self-contained classes at the elementary level (Grades K-6) is approximately 22. There is little variation in average class size above the Kindergarten level. Further disaggregation of the data was performed to determine the distribution of average class size along this range.

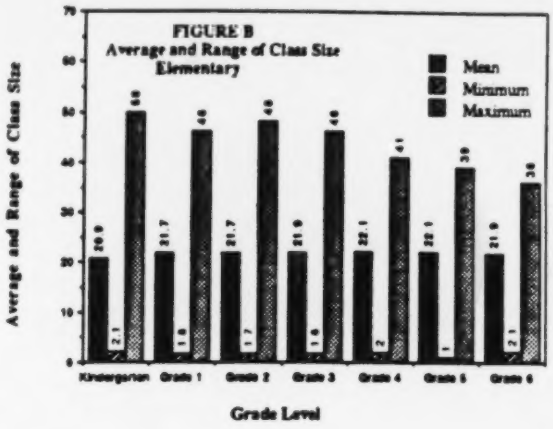


Table IV and Figure C illustrate the distribution of average class size at each grade level across five groupings: % below 12, % 12-17, % 18-23, % 24-30, % > 30. Only a small percentage of schools (less than 17%) have average class sizes in grades K-6 below the recommended average of 15. Over 25% of all classes in grades 1-6 have averages over 24. Over 75% of the reporting schools have grades K-6 with average class sizes above the recommended effective maximum.

TABLE III

AVERAGE CLASS SIZE FOR SELF-CONTAINED CLASSES: GRADES KINDERGARTEN THROUGH GRADE 6

Grade Level	MEAN	MINIMUM	MAXIMUM
KINDER	20.9	2.1	50.0
GRADE 1	21.7	1.8	46.0
GRADE 2	21.7	1.7	48.0
GRADE 3	21.9	1.6	46.0
GRADE 4	22.1	2.0	41.0
GRADE 5	22.1	1.0	39.0
GRADE 6	21.9	2.1	36.0

TABLE IV

PERCENTAGE OF SCHOOLS WITH AVERAGE CLASS SIZES IN SELECTED CATEGORIES ELEMENTARY

Grade Level	%<12	%12-17	%18-23	%24-30	%>30
KINDER	1.7	16.6	58.9	20.1	2.7
GRADE 1	1.3	11.4	57.7	27.6	2.1
GRADE 2	1.6	10.7	58.0	27.8	1.9
GRADE 3	1.6	9.9	54.0	33.1	1.4
GRADE 4	1.9	9.8	59.5	26.8	2.0
GRADE 5	1.9	9.5	50.6	36.2	1.8
GRADE 6	2.4	11.9	49.4	35.6	0.8

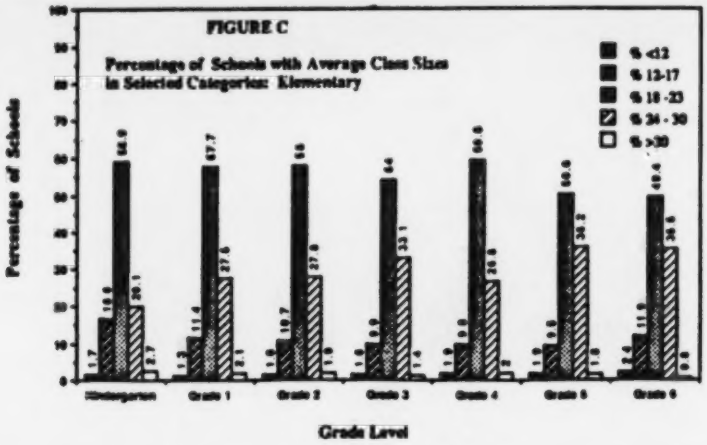


TABLE V and Figure D provide information on average class size at the middle and secondary school level by subject area. An average across all subject areas at each grade level appears at the far right of Table V. Overall, the average class size at the secondary level is approximately 20. Average class size decreased with each successive grade level from a high of 22.5 at Grade 7, to a low of 18.2 at Grade 12. Social Studies and Language Arts tend to have the largest average class sizes; Foreign Language the smallest.

TABLE V

AVERAGE CLASS SIZE BY GRADE LEVEL AND SUBJECT AREA:
GRADES 7 -12

Grade Level	Foreign Language	Language Arts	Mathematics	Science	Social Studies	Average of Means	Minimum	Maximum
Grade 7	20.9	22.7	22.6	23.2	23.1	22.5	2.1	31.0
Grade 8	20.6	22.0	22.0	22.5	22.6	21.9	2.1	28.0
Grade 9	19.3	20.7	19.7	20.0	20.7	20.1	3.0	31.0
Grade 10	18.4	20.4	19.5	20.1	20.4	19.8	3.0	31.0
Grade 11	16.7	20.2	19.6	19.4	20.7	19.3	3.0	31.0
Grade 12	15.0	19.7	18.3	17.6	20.2	18.2	2.0	31.0

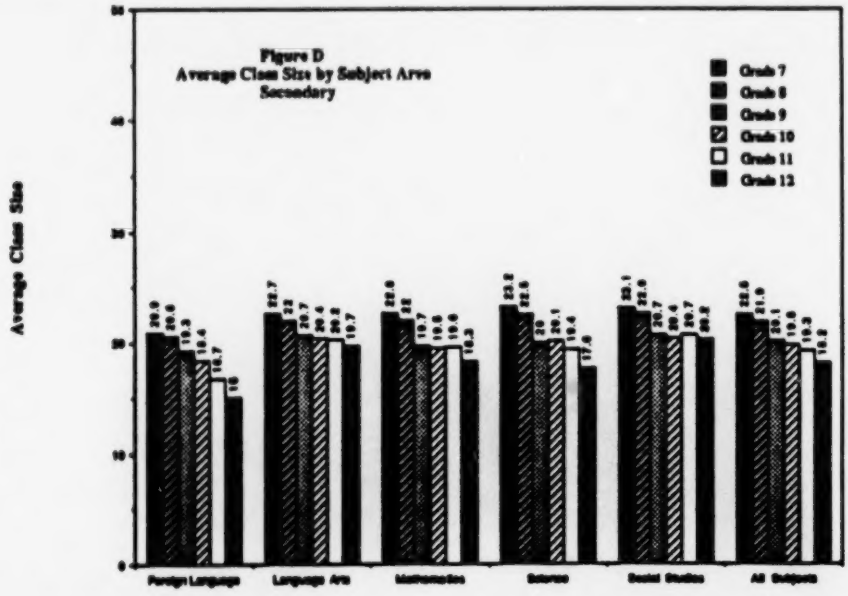
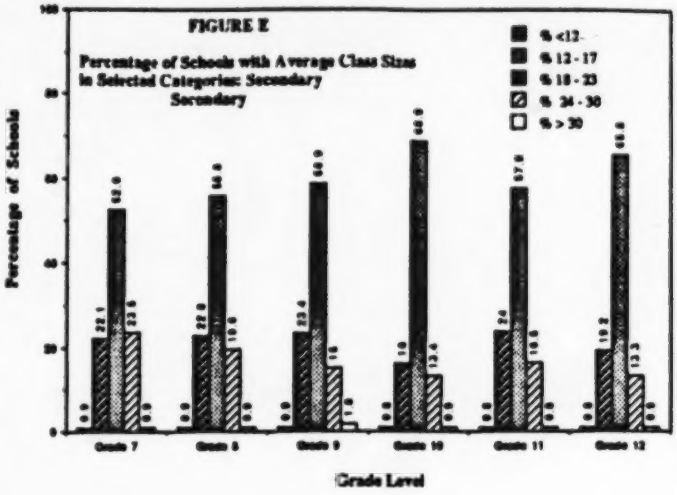


Table VI and Figure E further illustrate the distribution of average class size across all subject areas at each middle and secondary grade level across five groupings: % <12, % 12-17, % 18-23, % 24-30, %>30. At each grade level approximately 25% of the schools have an average class size of 17 or less; while approximately 75% of the schools have an average class size greater than 17.

TABLE VI

PERCENTAGE OF SCHOOLS WITH AVERAGE CLASS SIZES IN SELECTED CATEGORIES SECONDARY

Grade Level	%<12	%12-17	%18-23	%24-30	%>30
GRADE 7	0.9	22.1	52.6	23.6	0.9
GRADE 8	0.9	22.8	55.8	19.6	0.9
GRADE 9	0.9	23.4	58.9	16.0	1.8
GRADE 10	0.8	16.0	68.9	13.4	0.9
GRADE 11	0.8	24.0	57.9	16.5	0.8
GRADE 12	0.8	18.2	65.8	13.3	0.9



Class Size Average Results by Kind of Community

TABLE VII provides data on average class size at the elementary/middle/secondary school levels by grade levels across the seven kinds of communities in Massachusetts. Figure G represents the differences of the average of the means for each kind of community. The higher averages are evident in the urban centers and growth communities; the lowest averages found in small rural communities.

TABLE VII

AVERAGE CLASS SIZE BY GRADE LEVEL AND KIND OF COMMUNITY
GRADES KINDERGARTEN THROUGH GRADE 6

KIND OF COMMUNITY	KINDER	G1	G2	G3	G4	G5	G6	AVERAGE OF MEANS
Urban Center	20.6	21.8	21.9	26.0	22.3	22.6	21.8	22.4
Developed Suburbs	20.4	20.7	20.9	22.1	22.3	22.1	21.9	21.5
Growth Communities	20.9	22.5	22.2	23.1	22.8	23.6	23.7	22.7
Residential Suburb	19.8	20.7	21.3	21.3	21.5	22.0	21.0	21.1
Rural Economic	18.9	20.0	20.7	20.6	21.1	20.9	20.6	20.4
Small Rural	16.5	15.9	16.6	16.5	17.3	16.2	15.9	16.4
Resort/Retire/Art	19.4	20.0	18.6	17.8	19.2	16.9	17.1	18.4

AVERAGE CLASS SIZE BY GRADE LEVEL AND KIND OF COMMUNITY
GRADES 7 THROUGH 12

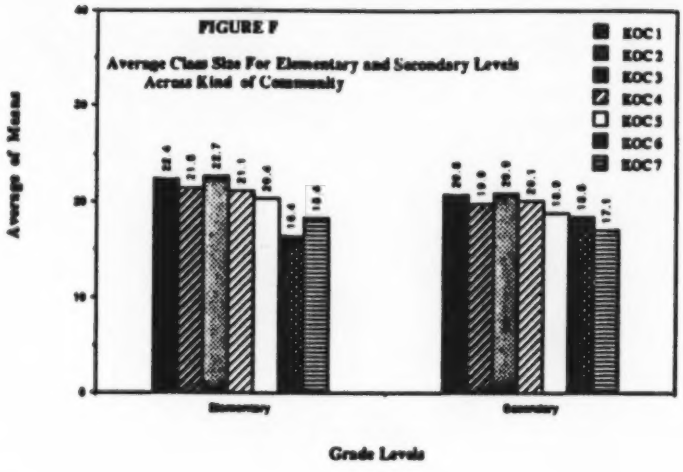
KIND OF COMMUNITY	G7	G8	G9	G10	G11	G12	AVERAGE OF MEANS
Urban Center	21.6	21.1	20.4	20.9	20.4	20.4	20.8
Developed Suburbs	20.8	20.7	19.5	19.4	19.6	19.1	19.9
Growth Communities	22.1	22.1	20.4	20.5	20.7	19.4	20.9
Residential Suburb	20.2	19.4	20.0	19.9	20.2	21.1	20.1
Rural Economic	20.2	19.3	18.1	18.4	18.4	18.9	18.9
Small Rural	17.9	19.9	18.0	20.5	18.0	16.7	18.5
Resort/Retire/Art	18.5	20.4	15.5	14.8	15.0	18.5	17.1

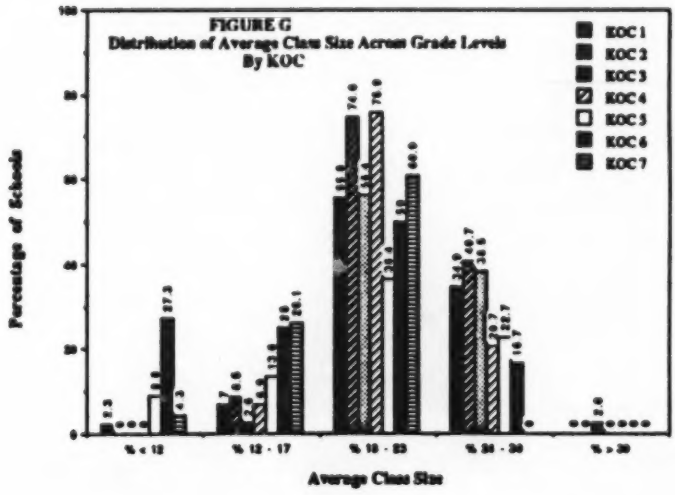
TABLE VIII and Figure G represent the distribution of average class size across subject areas in each kind of community across the five groupings: %<12, %12-17, %18-23, %24-30, %>30. Over 90% of the classes in schools in urban communities report an average class size greater than 17: only 50% of classes in small rural communities fall into this same category. In contrast, approximately 50% of the classes in small rural schools have average class sizes less than 17 while only 10% of urban school classes fall into this same category.

TABLE VIII

DISTRIBUTION OF AVERAGE CLASS SIZE ACROSS GRADE LEVELS BY KOC

	%<12	%12-17	%18-23	%24-30	%>30
KOC1	2.3	7.0	55.8	34.9	0
KOC2	0	8.5	74.6	40.7	0
KOC3	0	2.6	56.4	38.5	2.6
KOC4	0	6.9	75.9	20.7	0
KOC5	8.8	13.6	36.4	22.7	0
KOC6	27.3	25.	50.	16.7	0
KOC7	4.3	26.1	60.9	0	0





SECTION III: POLICY-MAKING CONSIDERATIONS

As previously stated, the purpose of this report is to establish baseline information on average class size in Massachusetts' public schools. The task does not lend itself to drawing conclusions or detailing recommendations. It has, however, provided direction and suggestions for further inquiry as average class size will be collected in future surveys.

For policy makers investigating class size alternatives, many educational organizations have summarized the research on class size in order to make recommendations to constituents. For example, The Education Commission of the States (ECS, 1988) offers the following suggestions when considering class-size reductions:

1) Define the goal. For example, improve achievement for which students? In which subjects? At what grade level? Improve teachers' morale, improve student self-concept, improve school climate, improve student attendance, etc.?

2) Examine the research that relates to the goal.

3) Monitor current class size initiatives as they relate to this goal.

4) Remember there is no one optimum class size. It is a function of many factors, including grade level, subject area, instructional methods, skills of teachers and aides, nature of pupils and availability of materials and facilities.

5) Provide funding for teacher inservice training. Teachers must be trained and supported in instructional methods to take advantage of smaller classes. Few, if any, pupil benefits can be expected if teachers continue to use the same instructional methods and procedures in smaller classes that they used in larger classes.

6) Analyze the cost.

SECTION IV: REPORT METHODOLOGY

Source Of Data

This report provides a first assessment of average class size on a statewide basis. Data were derived from the Chapter 188 Individual School Report (1987-88), an annual survey of Massachusetts' public schools conducted by the Massachusetts Department of Education. Initial results on average class size, first collected and reported on 1986-87 data were complicated by reporting errors. Therefore, 1987-88 data from this report will be considered baseline information. (Appendix A contains a copy of the survey form used to collect the average class size data).

Definition

The survey defined and requested average class size(s) in the following manner:

The average class size refers to the average number of students in each class by grade for each subject area. In cases where classes are not grouped by grade, the average class size should be the typical class size for students in that grade.

Because of the variety of ways that schools are organized, some districts expressed difficulty in fitting data into the categories on the report form. Based on the suggestions received, modifications are being made to the report form to reduce misinterpretation.

Data Collection

Copies of the Chapter 188 Individual School Report for 1987-88 were mailed to individual schools at the end of May 1988. School principals were asked to complete the report and forward it to their superintendent for review and verification. Reports were due in to the Department by the end of July 1988.

Response to the survey was high. Of the 1,798 public schools in Massachusetts surveyed from each of the schools within each of the 1,744 reported. At the elementary level, more than 90% reported; over 79% responded at the middle school level. Responses were more limited at the high school level with only 40% completing the information. Statewide data represent all but one of the Commonwealth's 365 operating school districts, including cities and towns, regional academic school districts, regional vocational-technical school districts, county agricultural schools and independent trade schools.

Verification of Data

The Department attempted to minimize reporting and processing errors in several ways. First, training sessions were held at each of the Department's regional education centers in June 1988, in conjunction with workshops on the End of Year Pupil and Financial Report. Second, every survey was reviewed by Department staff for apparent reporting errors before the data were automated. This review process uncovered problems such as incomplete information and illegible or misplaced responses. Third, after the surveys were automated, several arithmetic and logical checks were conducted to detect keypunch errors which could not have been easily discovered during the pre-automation review.

Finally, school's responses were reviewed for face validity. Individual school and district results were compared to the results of demographically similar schools and districts to expose data that were relatively high or low. When the validity of a school or district's results were in question, local school staff were contacted and asked to verify, and when necessary, correct the original responses.

Analysis of Data

After the data verification process was completed, the data were grouped by grade level organization. Using FOXBASE, a packaged database program, the grade levels from each of the schools within each of the districts were placed in one of the following categories:

GRADE LEVEL:	REPORTED BY:
Kindergarten	Self-Contained
Grade 1-3	Grade Level by Self-Contained
Grade 1-3	Grade Level by Subject Area
Grade 4-6	Grade Level by Self-Contained
Grade 4-6	Grade Level by Subject Area
Grade 7-8	Grade Level by Subject Area
Grade 9-12	Grade Level by Subject Area

While the above analysis approach was appropriate for a school organized from Kindergarten through Grade 6, individual school data may be represented in more than one of the categories.

Once the grade levels were sorted into their appropriate categories, statistical analysis using SPSS+/PC were performed to determine the mean and range of average class size; and the number and percent falling within specific size groupings. The results of the analysis are presented in both the charts and tables in the text and in the appendices following the report.

Limitations of the Data

Due to the "pioneer" status of this study, the quality of the data provided here may be limited for some of the following reasons:

Schools may have incorrectly reported average class sizes; a large percentage of the data received were entered without its re-verification with the district; if data were reported incorrectly at the building level, the error is aggregated through the district and state-levels.

Differences in school structures may also limit the accuracy, comparability or aggregation of data to the district or statewide level. Within districts, schools are organized in a variety of grade configurations. Within a school, grade level classes may also be organized in a variety of ways. For example, a K-6 school may have self-contained classrooms through Grade 4 with breaks in subject areas beginning in Grade 6.

The accuracy of average class size calculations may also be limited because of the statistical technique used in calculating average class sizes. Schools were asked to provide average class sizes for each grade. They were not asked to provide the actual number of classes or number of students within each class. In order to calculate class size averages for the school district, kind of community, or state, averages of average class sizes are used. This technique is not as accurate as summing the number of students and the number of classes and then dividing the number of classes by the number of students. The Massachusetts Department of Education will collect class size information this fall which will permit more accurate calculations in the future.